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R E M A R K S

The Office Action issued May 1, 2007 has been received and its contents have been carefully considered.

The words "and rear", which were inadvertently added to the specification on page 1, have been deleted.

Claim 21 has been amended to incorporate the subject matter of claim 32 and claim 32 has been canceled.

Claims 33, 35 and 36 have been amended to depend from claim 21.

Claim 21, the only independent claim in this application, now defines a method for increasing aircraft safety by representing the airspace in which an aircraft travels by a plurality of "volume elements", each of which may be associated with two probabilities:

The residence probability that an aircraft will be situated in the volume element at selected points in time and the "collision probability" of the aircraft with an object in that volume element at the selected points in time. This "collision probability" depends upon both the

residence probability of the aircraft in the volume element and the residence probability of an object in that volume element.

According to the invention, the latter residence probability is set equal to one for each volume element of the prohibited airspace, and if the collision probability exceeds a predetermined threshold value for at least one volume element of this prohibited airspace, an alternative route of the aircraft is calculated and the aircraft is automatically directed to this alternative route, which is situated outside the prohibited airspace.

Claim 32 (now incorporated into its parent claim 21) has been rejected under 35 USC §103(a) as being unpatentable over the Patent Publication No. US 2003/0055540 to Hansen in view of U.S. Patent No. 6,201,482 to Schiefele et al. and "Applicants' admitted prior art"; i.e., European Patent No. EP 0 886 847 B1. Since the European patent corresponds exactly to the U.S. Patent No. 6,201,482, only this U.S. patent will be discussed.

As this rejection may apply to applicants' independent claim 21, as now amended, the rejection is respectfully traversed.

Like the present invention, the patent to Hansen discloses an aircraft flight control system and method which are designed to prevent the aircraft from entering a prohibited airspace. As shown in Fig. 2 of this reference, the aircraft velocity 21 is shown vectorally as the sum of the velocity component 22 perpendicular to the nearest point of a no-fly zone 18 and a velocity component 23 parallel to the no-fly zone. The perpendicular component 22 is used for calculating the likelihood of a possible breach of the no-fly zone. When the likelihood exceeds a permissible threshold, a third party, such as an air traffic controller in the control tower 24, is alerted of the possible breach.

The light control system on the aircraft includes a computerized database of prohibited flying areas, a GPS sensor that presents the current coordinates of the aircraft, and an "override control computer" 15 which calculates possible breaches of prohibited areas and "automatically pilots the aircraft away from the prohibited flying areas in the event of an airspace violations." (Patent Claim 1).

The patent to Schiefele et al. (two patentees of which are the named inventors in the present application) discloses a method for identifying the risk of collision

between an aircraft and other objects, wherein the airspace is divided into a plurality of volume elements and the following probabilities are calculated:

(a) the probabilities that the aircraft will be situated in predetermined volume elements at a plurality of selected times (residence probabilities); and

(b) the probabilities of the simultaneous occupancy by the aircraft and another object (collision probabilities) in the predetermined volume elements at the selected times.

In Schiefele et al., this method is carried out to detect the collision risk between the aircraft and other objects.

The Examiner states (Office Action, page 7, lines 6-9) that "it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include the safety method taught by [Schiefele et al. in] the control system of Hansen in order to facilitate prediction of the collision probabilities of the aircraft with moving or stationary objects." In other words, the Examiner contends it would have been obvious to incorporate the collision avoidance system of Schiefele et al. into the flight control system of Hansen to prevent penetration of

prohibited airspace. Applicants submits this contention is untenable for the following reasons:

1. Although Schiefele et al. does teach the method step of calculating one or more evasive routes to avoid possible collisions, such routes are merely displayed as suggestions to the pilot and would not, in themselves, prevent a collision. The calculations of evasive routes are not used to positively control the aircraft but are used to provide assistance to the pilot in selecting the best avoidance route. There is no suggestion in Schiefele et al. that control can or should be taken away from the pilot so that the aircraft is "automatically steered...on the alternative route which is situated outside the prohibitive airspace..." (applicants' claim 21).

2. In Schiefele et al., the residence probability of a volume element is set equal to one only when a material object, such as a skyscraper, is actually present in that volume element. Schiefele et al. do not teach or suggest that the residence probability of a volume element of empty airspace be set equal to one.

3. Even if the teaching of Schiefele et al. could readily be incorporated into the system of Hansen (which is a stretch) the result would not produce the present

invention. The resulting system would display proposed alternative routes for the pilot, but would not prevent the aircraft from entering the protected airspace.


Applicants' method, as now recited in independent claim 21, results in some surprising advantages over the system of Hansen. In particular, applicants' method of calculating probabilities results in the early calculation of an alternative route so that the aircraft can be diverted early and will not penetrate the protected airspace. Further, if the aircraft happens to fly parallel to the boundary of a protected airspace (within a sufficient margin of safety) the method of calculating collision probabilities allows the aircraft to proceed along its flight path undisturbed.

The remaining references cited by the Examiner, but not applied against the combination of claims 21 and 32, have been reviewed but are believed to be substantially less relevant to claim 21, as amended, than Hansen and Schielfele et al. Accordingly, claim 21 is believed to distinguish patentably over all of the references of record.

Since the remaining claims of this application, claims 22-31 and 33-40 are all dependent, either directly or indirectly, from claim 21, as amended, this application is believed to be in condition for immediate allowance. A

formal Notice of Allowance is accordingly respectfully  
solicited.

Respectfully submitted,


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